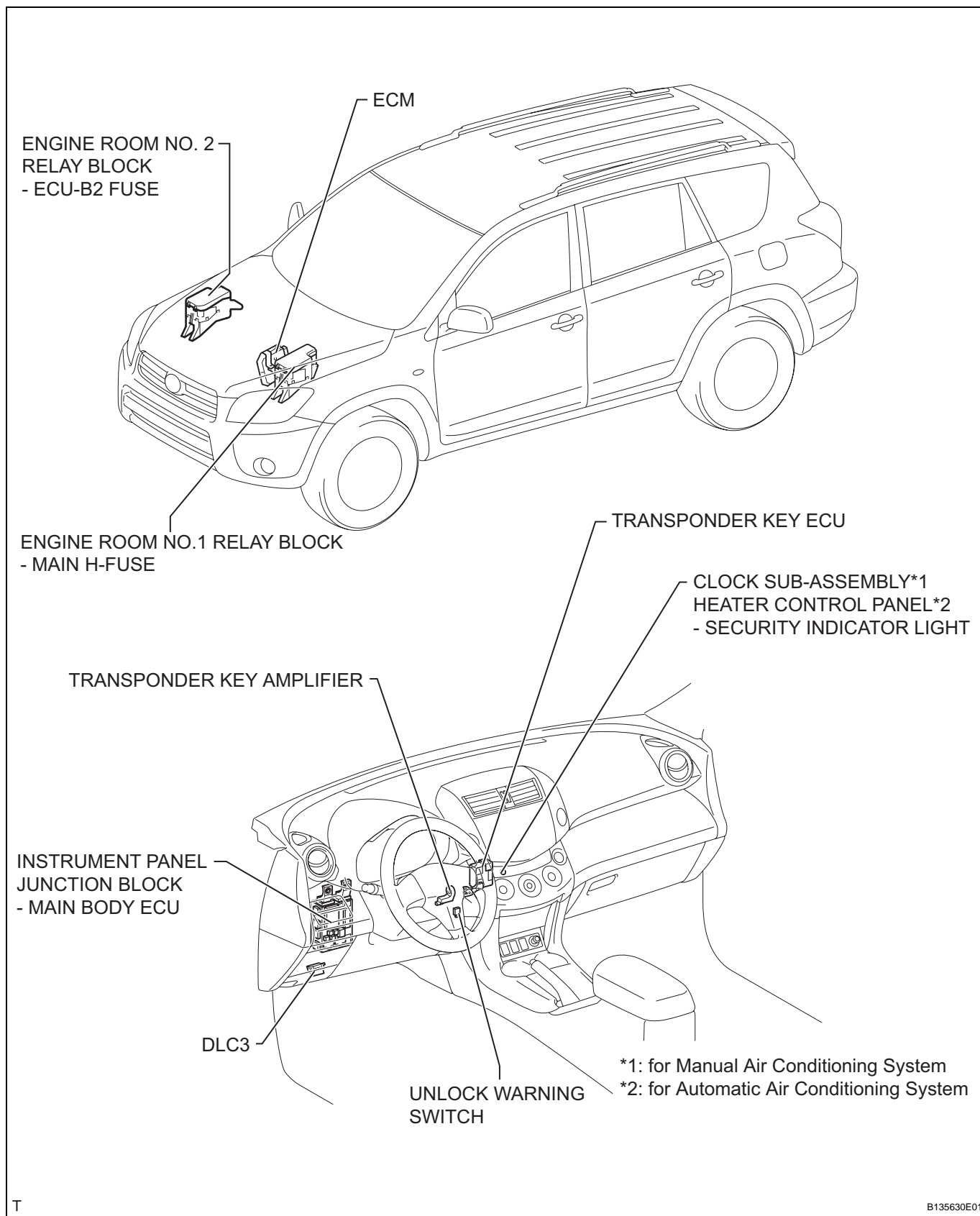
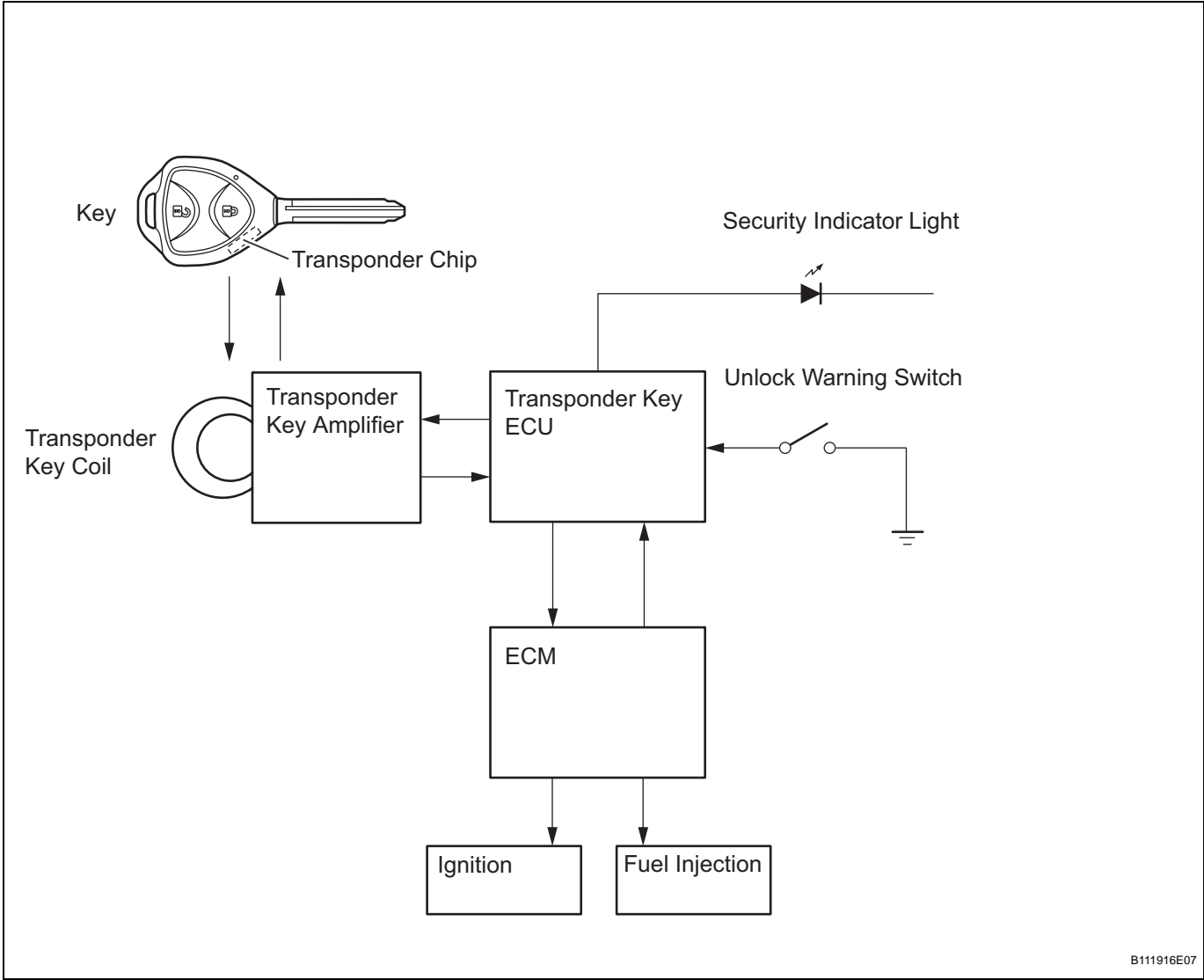


ENGINE IMMOBILISER SYSTEM

PARTS LOCATION



SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

The engine immobiliser system is designed to prevent the vehicle from being stolen. This system uses a transponder key ECU that stores the key codes of authorized ignition keys. If an attempt is made to start the engine using an unauthorized key, the ECU sends a signal to the ECM to prohibit fuel delivery and ignition, effectively disabling the engine.

2. FUNCTION OF MAIN COMPONENT

| Component | Outline |
|--------------------------------|--|
| Transponder key coil/amplifier | When key is inserted into ignition key cylinder, key coil receives key code. Then amplifier amplifies ID code and outputs it to transponder key ECU. |
| Unlock warning switch assembly | Detects whether key is in ignition key cylinder and outputs results to transponder key ECU |
| ECM | Through SFI communication, ECM receives ID verification results from transponder key ECU. ECM also verifies ECUs. Then ECM judges whether or not to immobilize engine. |
| Security indicator light | Depending on operation of transponder key ECU, interior security indicator light comes on or starts blinking |

3. SYSTEM FUNCTION

- When the transponder key ECU detects that the unlock warning switch is ON, the ECU provides current to the transponder key coil and produces a faint electric wave. A transponder chip in the key grip receives the wave and outputs a key ID code signal. The transponder key coil receives this signal, the transponder key amplifier amplifies it, and then the signal is transmitted to the ECU. The ECU matches the key's ID code with the vehicle's ID code, which was previously registered in the ECU and then communicates the results to the ECM using SFI communication.
- After the identification results show that the key's ID code matches the vehicle's ID code and the ECU has confirmed their match: 1) the engine immobiliser system is canceled and the engine starting controls (fuel injection control and ignition control) enter standby mode; and 2) the ECU receives a security indicator light signal, and turns the security indicator light OFF.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
Use these procedures to troubleshoot the engine immobiliser system.
*: Use the intelligent tester.

1

VEHICLE BROUGHT TO WORKSHOP

NEXT

2

INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V
If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3

CRANK ENGINE FOR MORE THAN 10 SECONDS

NEXT

4

CHECK FOR DTC*

- (a) Check for DTCs and make a note of any codes that are output (see page [EI-18](#)).
- (b) Clear the DTC.
- (c) Recheck for DTCs. Based on the DTC output above, try to cause the output of the same SFI system DTC or engine immobiliser system DTC by simulating the original activity indicated by the DTC.

Result:

| Result | Proceed to |
|---|------------|
| DTC output does not reoccur | A |
| SFI system DTC output reoccurs | B |
| Engine immobiliser system DTC output reoccurs | C |

B

Go to SFI SYSTEM

D

Go to step 7

A

5 PROBLEM SYMPTOMS TABLE

Result:

| Result | Proceed to |
|---|------------|
| Fault is not listed in problem symptoms table | A |
| Fault is listed in problem symptoms table | B |

B

Go to step 7

A

6 OVERALL ANALYSIS AND TROUBLESHOOTING*

- (a) DATA LIST / ACTIVE TEST (see page [EI-19](#))
- (b) Terminals of ECU (see page [EI-13](#))
- (c) Inspection (see page [EI-43](#))

NEXT

7 ADJUST, REPAIR OR REPLACE

NEXT

8 CONFIRMATION TEST

NEXT

END

REGISTRATION

HINT:

The key has 2 codes: the key code (immobiliser code) and the wireless code (recognition code). Both of these codes need to be registered. For wireless code registration procedures, refer to the following procedures (see page [DL-46](#)). For key code registration procedures, refer to the procedures below.

1. DESCRIPTION OF CODE REGISTRATION

- (a) When adding master keys and sub-keys (additional registration).

- (1) Register the key codes in the transponder key ECU.

| Target ECU | See Procedure |
|---------------------|---------------|
| Transponder key ECU | Procedure "A" |

- (b) After replacing the transponder key ECU (new key code registration).

- (1) Register the key codes (immobiliser code) in the new transponder key ECU.

| Target ECU | See Procedure |
|---------------------|---------------|
| Transponder key ECU | Procedure "B" |

- (2) Register the ECU COMMUNICATION ID between the ECM and the new transponder key ECU.

| Target ECU | See Procedure |
|------------|---------------|
| ECM | Procedure "C" |

- (c) After replacing the ECM.

- (1) Reregister the ECU COMMUNICATION ID between the new ECM and the transponder key ECU.

| Target ECU | See Procedure |
|---------------------|---------------|
| Transponder key ECU | Procedure "C" |

- (d) After replacing the transponder key ECU and ECM.

- (1) Register the ECU COMMUNICATION ID between the new ECM and the new transponder key ECU.

| Target ECU | See Procedure |
|---------------------|---------------|
| Transponder key ECU | Procedure "C" |

- (e) Erasure of key codes.

- (1) Erase the key code(s) of the lost key(s).

| Target ECU | See Procedure |
|---------------------|---------------|
| Transponder key ECU | Procedure "D" |

2. NEW KEY CODE REGISTRATION (PROCEDURE "B")

- (a) New key code registration

Condition:

No key codes are registered in the transponder key ECU.

HINT:

- In this mode, a maximum of 3 key codes for 2 master keys and 1 sub-key can be registered. The master keys and sub-key can be registered in any order because the transponder key ECU can distinguish between different types of keys.
- New key codes must be registered with the battery connected. The ignition switch can be either ON or OFF.
- When a new transponder key ECU is installed, key codes must be registered in the transponder key ECU.

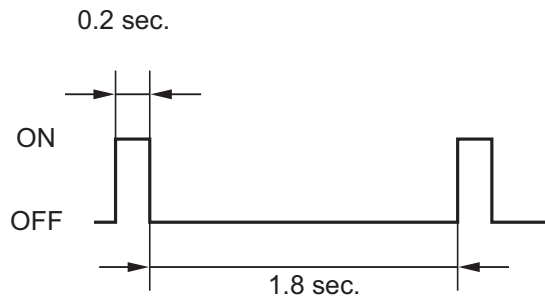
| Procedure | Security Indicator Light Condition |
|---|--|
| 1. START | - HINT: Until first key is inserted |
| 2. Insert key into the ignition key cylinder | BLINKING |
| 3. Select following items on the tester: (1) IMMOBILISER (2) ID UTILITY (3) IMMOB CODE REG HINT: After above operation, proceed to next step in accordance with prompts on tester screen | ON HINT: Within 2 minutes OFF for 1 second and then ON |
| 4. Remove the key and then push NEXT button on tester | ON |
| 5. Insert master key or sub-key to be registered | OFF for 1 second and then ON |
| 6. Remove key and then push NEXT button on tester | ON |
| 7. Insert a master key or sub-key to be registered | OFF for 1 second and then ON OFF HINT: 0.5 seconds after turning ON |
| 8. Remove key | BLINKING |
| 9. END | |

HINT:

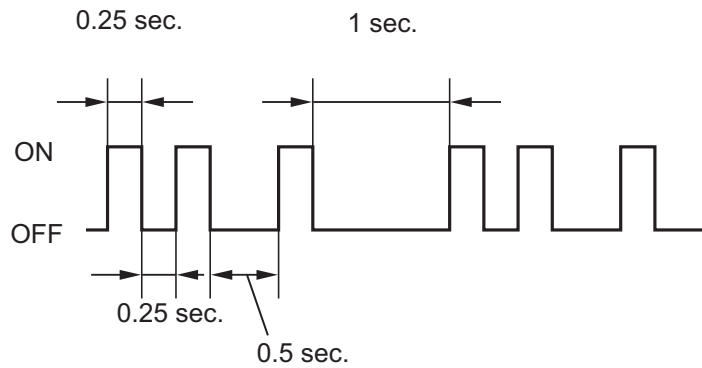
- The new key code registration mode can be deliberately ended by following procedure A or B below when the battery is connected, and at least 1 key code for the master key has been registered.
 - (a) Insert the key into the ignition key cylinder and turn the intelligent tester on.
 - (b) Follow the instructions on the intelligent tester screen to end the new key code registration mode.
 - (c) New key code registration mode ends.
- When the engine immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.
- If the new key code registration fails, code 2-1 is output by the security indicator light. Trying to re-register an already registered key causes code 2-2 to be output when the key is inserted. If the number of registered key codes exceeds the limit, code 2-3 is output by the security indicator light. The output details are shown below.

Security Indicator Light:

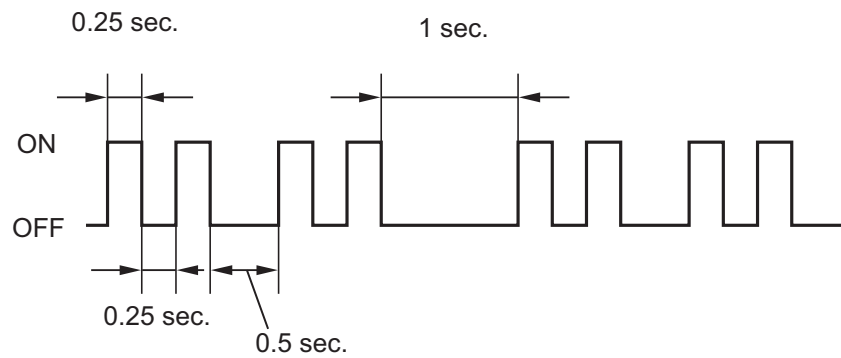
Normal (Engine immobiliser system is operating normally)



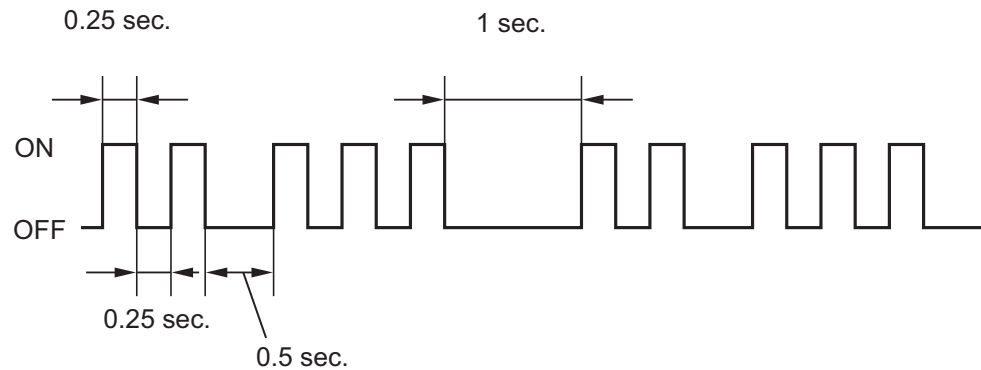
Code 2-1



Code 2-2



Code 2-3



3. REGISTRATION OF ADDITIONAL KEY (PROCEDURE "A")

HINT:

- A maximum of 5 master key codes and 3 sub-key codes can be registered.
- Additional key code registration mode ends if each step is not completed within the specified time.
- When proceeding to the next step while the timer is running, the timer is reset and begins the countdown for the next step.
- When the ignition key cylinder or the ignition key cylinder set is replaced, remove the transmitter module from the original master key. Then install this transmitter module to a new key and use the new key as the master key. If necessary, use this master key to register other keys.

NOTICE:

When the ignition key cylinder has been replaced, locking and unlocking doors are possible with the new master key once the transmitter module from the original master key has been transferred to it. However, the new master key will not be able to lock and unlock doors through the door key cylinder. Keep the original master key. If the new master key's transmitter module battery fails, the original master key can be used to lock and unlock doors through the door key cylinder.

- (a) Additional key code registration

Condition:

At least one key code must be registered in the transponder key ECU.

| Procedure | Time (Operation completion time) | Security Indicator Light Condition |
|--|---|--|
| 1. START | - | BLINKING HINT: Until first key is inserted |
| 2. Insert previously registered master key into ignition key cylinder, turn ignition switch to ON position, and turn intelligent tester on | - | OFF |
| 3. Select the following items on the tester: (1) IMMOBILISER (2) ID UTILITY (3) IMMOB CODE REG | | ON |
| 4. Remove master key and then push NEXT button on tester. Immediately after above operation, insert previously registered master key into ignition key cylinder, turn ignition switch to ON position, and then push NEXT button on tester. | Within 120 seconds | BLINKING → ON |
| 5. Remove master key and then push NEXT button on tester | Within 20 seconds HINT: After the tester instruction. | ON |
| 6. Insert key to be registered into ignition key cylinder | Within 10 seconds. | BLINKING |

| Procedure | Time (Operation completion time) | Security Indicator Light Condition |
|--|-------------------------------------|------------------------------------|
| 7. After 60 seconds, key is registered HINT: Security indicator light goes off | - | OFF |
| 8. Remove key and then push NEXT button on tester | | BLINKING |
| 9. Tester screen displays number of registered key | | |
| 10. END | | |

HINT:

- If the key is removed within 60 seconds in step 6, the additional key code registration mode is canceled.
- A brief outline of the procedures for key code registration is shown above. For more detailed information, refer to the intelligent tester screen's instructions.
- When the engine immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.
- If the additional key code registration fails, code 2-1 is output by the security indicator light. Trying to reregister a previously registered key causes code 2-2 to be output when the key is inserted. If the number of registered key codes exceeds the limit, code 2-3 is output by the security indicator light. The output details are shown in procedure "B".

4. ERASURE OF KEY CODE (PROCEDURE "D")**HINT:**

All key codes are erased except for the master key, which is used for erasing the key codes. In order to use a key whose code has been erased, a new key code must be registered.

(a) Erasure of key code**Condition:**

At least two key codes must be registered in the transponder key ECU.

| Procedure | Time (Operation completion time) | Security Indicator Light Condition |
|---|-------------------------------------|--|
| 1. START | - | BLINKING HINT: Until first key is inserted |
| 2. Insert previously registered master key into ignition key cylinder, turn ignition switch to ON position, and turn intelligent tester on | - | OFF |
| 3. Select following items on tester: (1) IMMOBILISER (2) ID UTILITY (3) IMMOB CODE ERS | | OFF |
| 4. Remove key and then push NEXT button on tester. Immediately after above operation, insert previously registered master key into ignition key cylinder, turn ignition switch to ON position, and then push NEXT button on tester. | Within 120 seconds | BLINKING → ON for 1 second then OFF |

| Procedure | Time (Operation completion time) | Security Indicator Light Condition |
|----------------------|--|------------------------------------|
| 5. Remove master key | Within 10 seconds HINT: After tester instruction | BLINKING |
| 6. END | | |

HINT:

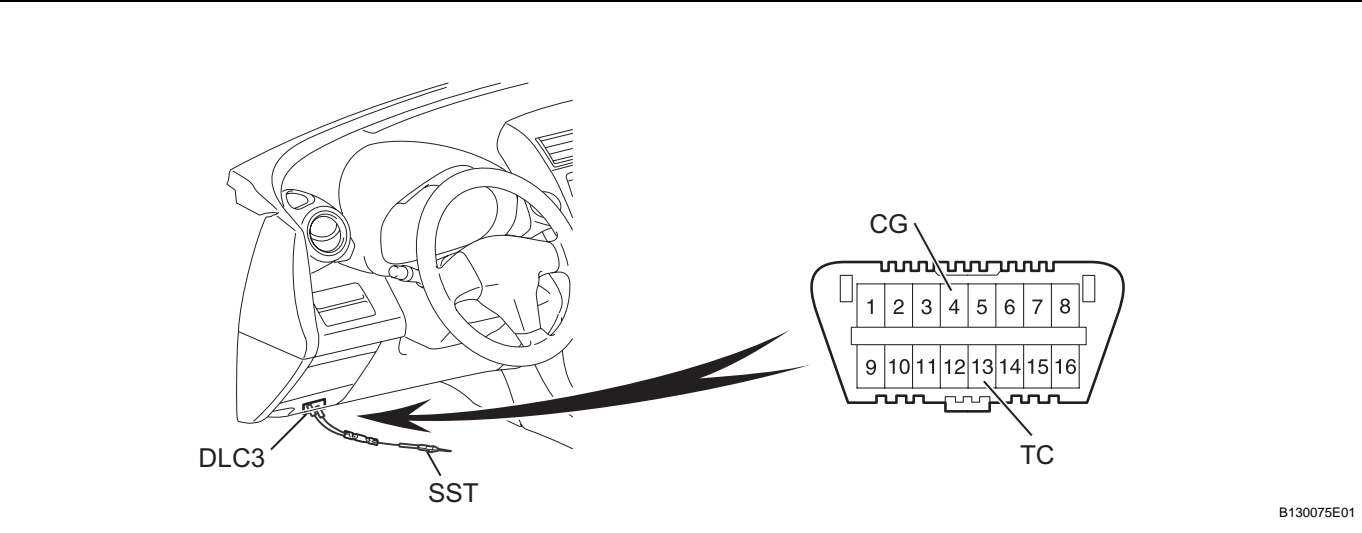
- To cancel erasure mode after the erasure request is sent from the tester to the ECU, leave the master key inserted until the timer times out.
- A brief outline of the procedures for key code erasure is shown above. For more detailed information, refer to the intelligent tester screen's instructions.
- When the engine immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.

5. ECU - ECM COMMUNICATION ID REGISTRATION (PROCEDURE "C")

NOTICE:

- The ECU communication ID should be registered when the transponder key ECU and / or ECM is replaced in order to match the ECU - ECM communication ID.
 - The engine cannot be started unless the ECU - ECM communication ID matches.
 - Do not disconnect the battery while the ECU - ECM communication ID is being set.
 - Do not turn the ignition switch from ON to OFF 20 times or more before setting the ECU - ECM communication ID. If this operation is likely to be performed 20 times or more, disconnect the negative battery terminal cable in order to avoid engine start disablement. Failure to do so will result in the engine not starting unless the transponder key ECU is replaced with a new one.
- (a) After replacing the transponder key ECU
- (1) Register the key code(s) by following the new key code registration procedure (procedure "B").
 - (2) Using SST, connect the TC and CG terminals of the DLC3 before inserting the key into the key cylinder.

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- (3) Insert a previously registered key into the ignition key cylinder, turn the ignition switch ON (do not start the engine), and leave it as is for 30 minutes.
- (4) Turn the ignition switch OFF and disconnect terminals TC and CG.
- (5) Start the engine.
- (6) Check that the engine starts and stays on for more than 3 seconds. The registration is complete.
- (b) After replacing the ECM.

(1) Register the ECU - ECM communication ID

| Procedure | Security Indicator Light Condition |
|---|------------------------------------|
| 1. Insert previously registered key into ignition key cylinder | OFF |
| 2. Start engine | |
| 3. Check that engine starts and stays on for more than 3 seconds. Registration is complete. | |

- (c) After replacing the transponder key ECU and ECM

(1) Register the key code(s) by following the new key code registration procedure (procedure "B").

(2) Register the ECU - ECM communication ID

| Procedure | Security Indicator Light Condition |
|---|------------------------------------|
| 1. Insert previously registered key into ignition key cylinder | OFF |
| 2. Start engine | |
| 3. Check that engine starts and stays on for more than 3 seconds. Registration is complete. | |

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Engine immobiliser system:

| Symptom | Suspected area | See page |
|--------------------------------------|-----------------------------|-----------------------|
| Engine does not start | 1. ECU power source circuit | EI-41 |
| | 2. SFI system | ES-24 |
| Security indicator light malfunction | 1. Clock sub-assembly*1 | EI-38 |
| | 2. Heater control panel*2 | EI-38 |
| | 3. Transponder key ECU | EI-38 |

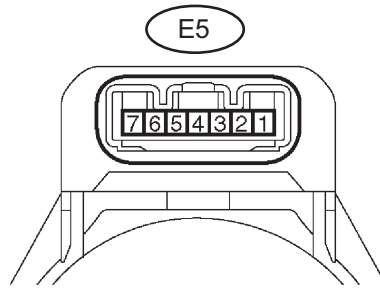
HINT:

*1: for Manual air conditioning system

*2: for Automatic air conditioning system

TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER



B065593E16

- (a) Disconnect the E5 amplifier connector.
- (b) Measure the resistance of the wire harness side connector.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---------------------------|-----------------|----------------------|-----------|---------------------|
| AGND (E5-7) - Body ground | R - Body ground | Ground | Always | Below 1 Ω |

If the result is not as specified, there may be a malfunction in the wire harness.

- (c) Reconnect the E5 amplifier connector.
- (d) Measure the resistance and voltage of the connector.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---------------------------|-----------------|-------------------------------------|------------------------------------|-----------------------------------|
| AGND (E5-7) - Body ground | R - Body ground | Ground | Always | Below 1 Ω |
| VC5 (E5-1) - AGND (E5-7) | B - R | Power source | No key is in ignition key cylinder | Below 1 V |
| | | | Key inserted | 4.6 to 5.4 V |
| CODE (E5-4) - AGND (E5-7) | P - R | Demodulated signal of key code data | No key is in ignition key cylinder | Below 1 V |
| | | | Key inserted | Pulse generation (see waveform 1) |
| TXCT (E5-5) - AGND (E5-7) | G - R | Key code output signal | No key is in ignition key cylinder | Below 1 V |
| | | | Key inserted | Pulse generation (see waveform 2) |

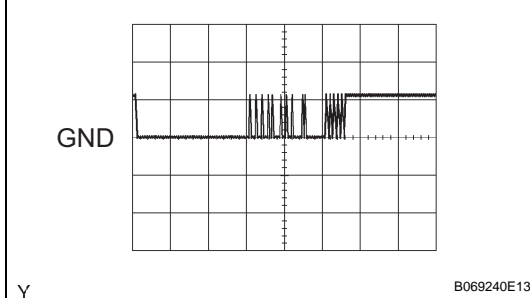
If the result is not as specified, there may be a malfunction in the amplifier.

- (e) Using an oscilloscope, check the waveform 1.

Waveform 1 (Reference):

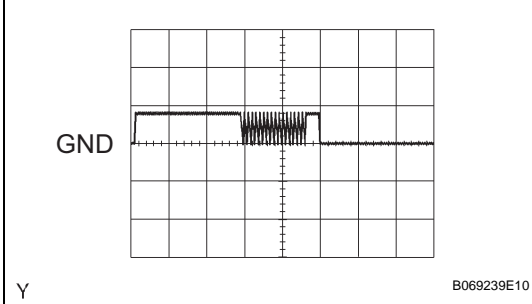
| Item | Content |
|------------------------|---------------------------|
| Symbols (Terminal No.) | CODE (E5-4) - AGND (E5-7) |
| Tool Setting | 5 V/DIV., 20 msec./DIV. |
| Condition | Key inserted |

Waveform 1



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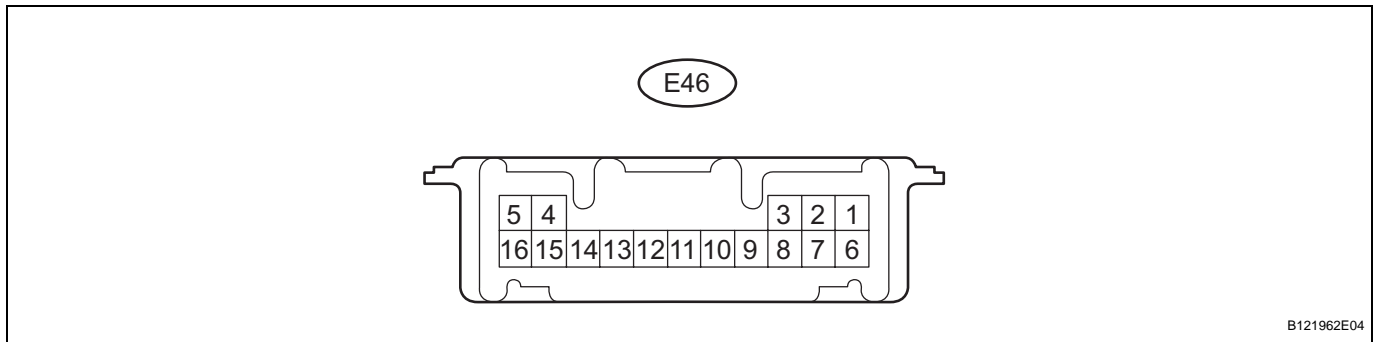
Waveform 2



(f) Using an oscilloscope, check the waveform 2.

Waveform 2 (Reference):

| Item | Content |
|------------------------|---------------------------|
| Symbols (Terminal No.) | TXCT (E5-5) - AGND (E5-7) |
| Tool Setting | 5 V/DIV., 20 msec./DIV. |
| Condition | Key inserted |

2. CHECK TRANSPONDER KEY ECU

- (a) Disconnect the E46 ECU connector.
 (b) Measure the resistance and voltage of the wire harness side connector.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|----------------------------|-------------------|----------------------|---------------------|---------------------|
| GND (E46-16) - Body ground | W-B - Body ground | Ground | Always | Below 1 Ω |
| +B (E46-1) - GND (E46-16) | R - W-B | Battery | Always | 10 to 14 V |
| IG (E46-2) - GND (E46-16) | B - W-B | Ignition switch | Ignition switch OFF | Below 1 V |
| | | | Ignition switch ON | 10 to 14 V |

If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the E46 ECU connector.
 (d) Measure the resistance and voltage of the connector.

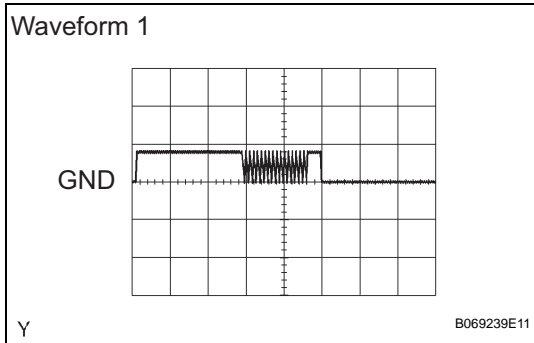
| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|------------------------------|--------------|--|------------------------------------|-----------------------------------|
| AGND (E46-5) - GND (E46-16) | R - W-B | Amplifier ground circuit | Always | Below 1 Ω |
| EGND (E46-11) - GND (E46-16) | V - W-B | ECM ground circuit | Always | Below 1 Ω |
| KSW (E46-3) - GND (E46-16) | L - W-B | Unlock warning switch | No key is in ignition key cylinder | 10 to 14 V |
| | | | Key inserted | Below 1 V |
| VC5 (E46-14) - AGND (E46-5) | B - R | Power source | No key is in ignition key cylinder | Below 1 V |
| | | | Key inserted | 4.6 to 5.4 V |
| TXCT (E46-4) - AGND (E46-5) | G - R | Transponder key amplifier communication signal | No key is in ignition key cylinder | Below 1 V |
| | | | Key inserted | Pulse generation (see waveform 1) |

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|-------------------------------|--------------|--|------------------------------------|-----------------------------------|
| CODE (E46-15) - AGND (E46-5) | P - R | Transponder key amplifier communication signal | No key is in ignition key cylinder | Below 1 V |
| | | | Key inserted | Pulse generation (see waveform 2) |
| EFIO (E46-13) - EGND (E46-11) | P - V | ECM output signal | Ignition switch OFF | Below 1 V |
| | | | Ignition switch ON | Pulse generation (see waveform 3) |
| EFII (E46-12) - EGND (E46-11) | LG - V | ECM input signal | Ignition switch OFF | Below 1 V |
| | | | Ignition switch ON | Pulse generation (see waveform 3) |
| IND (E46-8) - GND (E46-16) | Y - W-B | Security indicator light signal | Engine immobiliser system SET | 3 to 5 V |
| | | | Engine immobiliser system UNSET | Below 1 V |
| D (E46-9) - GND (E46-16) | W - W-B | Diagnosis tester communication | Ignition switch ON | Pulse generation |

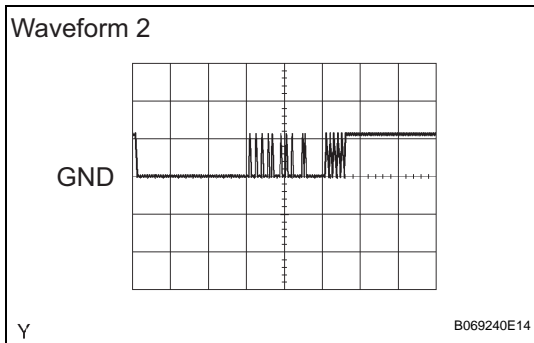
If the result is not as specified, there may be a malfunction in the ECU.

(e) Using an oscilloscope, check the waveform 1.

Waveform 1 (Reference):



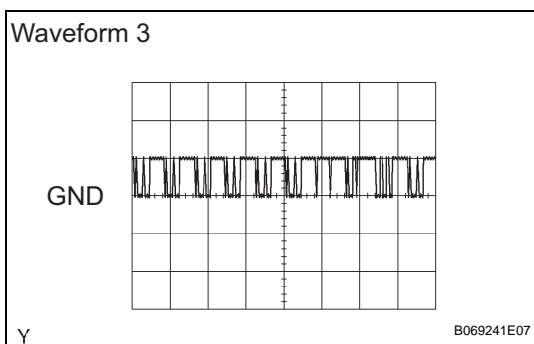
| Item | Content |
|------------------------|-----------------------------|
| Symbols (Terminal No.) | TXCT (E46-4) - AGND (E46-5) |
| Tool Setting | 5 V/DIV., 20 msec./DIV. |
| Condition | Key inserted |



(f) Using an oscilloscope, check the waveform 2.

Waveform 2 (Reference):

| Item | Content |
|------------------------|------------------------------|
| Symbols (Terminal No.) | CODE (E46-15) - AGND (E46-5) |
| Tool Setting | 5 V/DIV., 20 msec./DIV. |
| Condition | Key inserted |

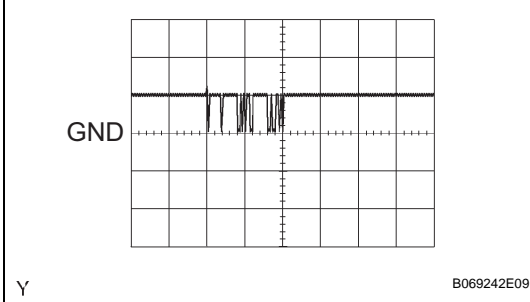


(g) Using an oscilloscope, check the waveform 3.

Waveform 3 (Reference):

| Item | Content |
|------------------------|-------------------------------|
| Symbols (Terminal No.) | EFIO (E46-13) - EGND (E46-11) |
| Tool Setting | 10 V/DIV., 500 msec./DIV. |
| Condition | Ignition switch ON |

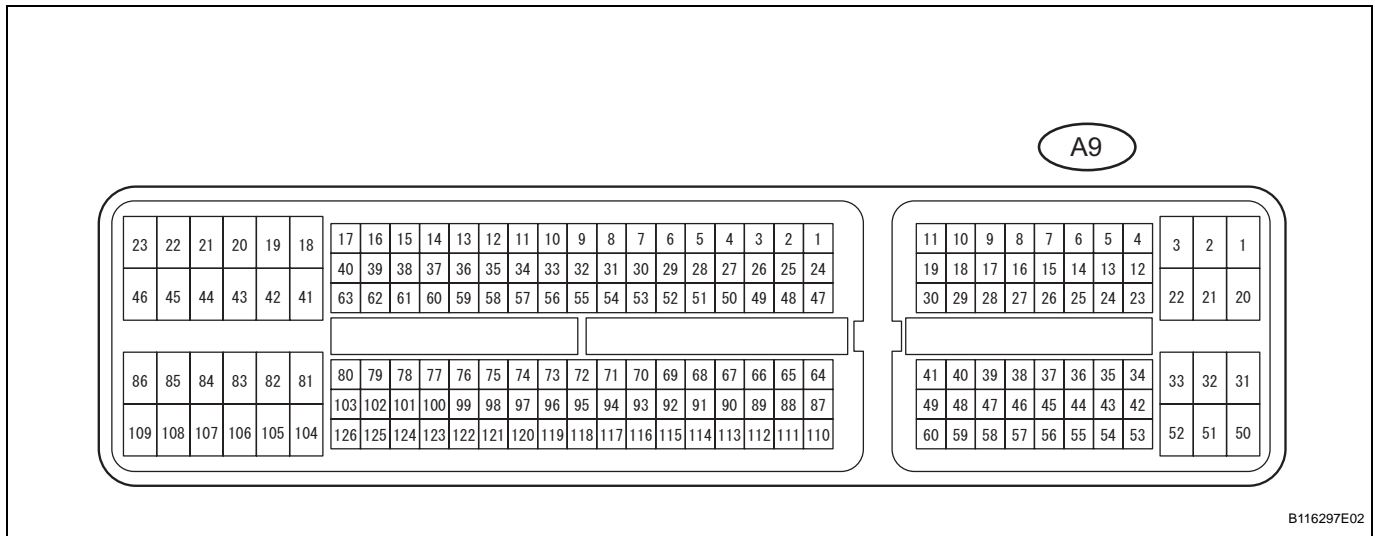
Waveform 4



(h) Using an oscilloscope, check the waveform 4.

Waveform 4 (Reference):

| Item | Content |
|------------------------|-------------------------------|
| Symbols (Terminal No.) | EFII (E46-12) - EGND (E46-11) |
| Tool Setting | 10 V/DIV., 500 msec./DIV. |
| Condition | Ignition switch ON |

3. CHECK ECM

(a) Measure the resistance and voltage of the wire harness side connector.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|--------------------------|-----------------|-----------------------------------|---------------------|-----------------------------------|
| EOM (A9-9) - Body ground | V - Body ground | Ground | Always | Below 1 Ω |
| IMI (A9-11) - EOM (A9-9) | P - V | Transponder key ECU input signal | Ignition switch OFF | Below 1 V |
| | | | Ignition switch ON | Pulse generation (see waveform 1) |
| IMO (A9-10) - EOM (A9-9) | LG - V | Transponder key ECU output signal | Ignition switch OFF | Below 1 V |
| | | | Ignition switch ON | Pulse generation (see waveform 2) |

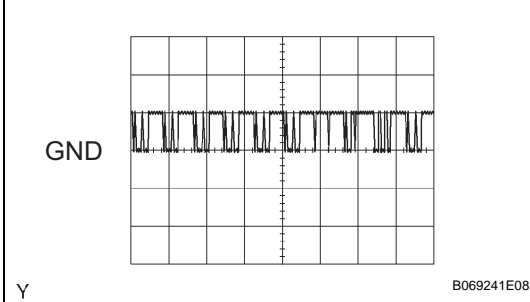
If the result is not as specified, there may be a malfunction in the wire harness.

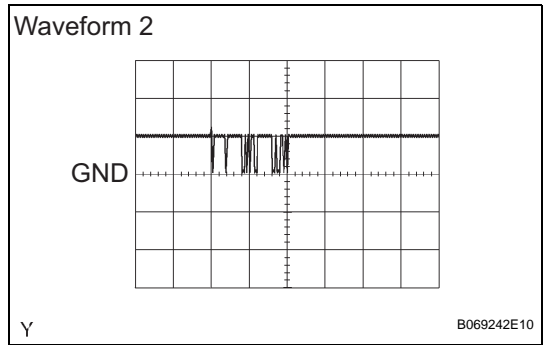
(b) Using an oscilloscope, check the waveform 1.

Waveform 1 (Reference):

| Item | Content |
|------------------------|---------------------------|
| Symbols (Terminal No.) | IMI (A9-11) - EOM (A9-9) |
| Tool Setting | 10 V/DIV., 500 msec./DIV. |
| Condition | Ignition switch ON |

Waveform 1





(c) Using an oscilloscope, check the waveform 2.
Waveform 2 (Reference):

| Item | Content |
|------------------------|---------------------------|
| Symbols (Terminal No.) | IMO (A9-10) - EOM (A9-9) |
| Tool Setting | 10 V/DIV., 500 msec./DIV. |
| Condition | Ignition switch ON |

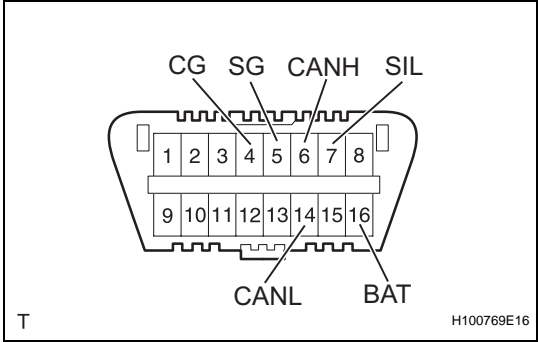
DIAGNOSIS SYSTEM

1. DESCRIPTION

- (a) Engine immobiliser system data and Diagnostic Trouble Codes (DTCs) can be read through the vehicle's Data Link Connector 3 (DLC3). In some cases, a malfunction may be occurring in the engine immobiliser system even though the security indicator light is not illuminated. When the system seems to be malfunctioning, use the intelligent tester to check for malfunctions and perform repairs.

2. CHECK DLC3

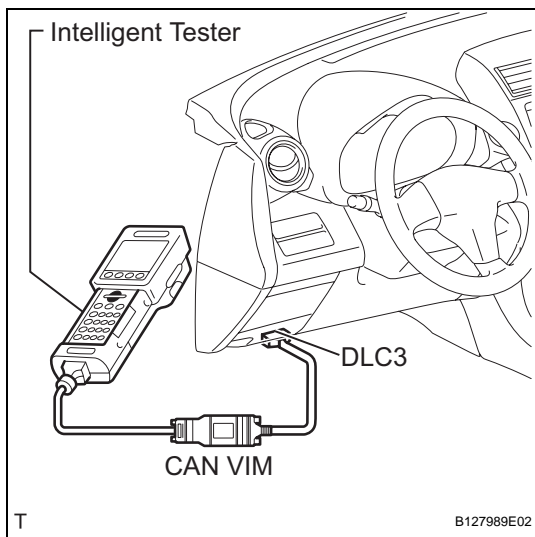
The vehicle's ECU uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



| Symbols (Terminal No.) | Terminal Description | Condition | Specified Condition |
|------------------------------|-------------------------|----------------------|---------------------|
| SIL (7) - SG (5) | Bus "+" line | During transmission | Pulse generation |
| CG (4) - Body ground | Chassis ground | Always | Below 1 Ω |
| SG (5) - Body ground | Signal ground | Always | Below 1 Ω |
| BAT (16) - Body ground | Battery positive | Always | 11 to 14 V |
| CANH (6) - CANL (14) | HIGH-level CAN bus line | Ignition switch off* | 54 to 69 Ω |
| CANH (6) - Battery positive | HIGH-level CAN bus line | Ignition switch off* | 1 kΩ or higher |
| CANH (6) - CG (4) | HIGH-level CAN bus line | Ignition switch off* | 1 kΩ or higher |
| CANL (14) - Battery positive | LOW-level CAN bus line | Ignition switch off* | 1 MΩ or higher |
| CANL (14) - CG (4) | LOW-level CAN bus line | Ignition switch off* | 1 MΩ or higher |

NOTICE:

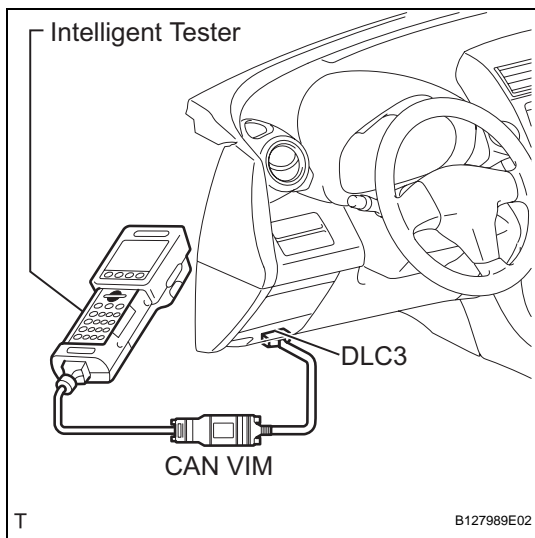
*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, other switches or doors. If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

**HINT:**

Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the ignition switch ON and attempt to use the intelligent tester. If the screen displays **UNABLE TO CONNECT TO VEHICLE**, a problem exists in the vehicle side or the tester side.

If the communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.

If the communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Consult the Service Department listed in the tester's instruction manual.

**DTC CHECK / CLEAR****1. CHECK DTC**

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON and turn the intelligent tester ON.
- (c) Select the following menu items: DIAGNOSIS / OBD/MOBD / IMMOBILISER / DTC INFO / CURRENT CODES.
- (d) Check DTCs and then write them down.

HINT:

Refer to the intelligent tester operator's manual for further details.

- (e) Confirm the details of the DTCs (see page [EI-20](#)).

2. CLEAR DTC

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON (do not start the engine) and turn the intelligent tester ON.
- (c) Select the following menu items: DIAGNOSIS / OBD/MOBD / IMMOBILISER / DTC INFO / CLEAR CODES.

HINT:

Refer to the intelligent tester operator's manual for further details.

- (d) Erase DTCs by pressing the YES button on the tester.

HINT:

Refer to the intelligent tester operator's manual for further details.

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the tester ON.
- Select the following menu items: DIAGNOSIS / OBD/MOBD / IMMOBILISER / DATA LIST.
- Check the results by referring to the table below.

Transponder key ECU:

| Item | Measurement Item / Display (Range) | Normal Condition | Diagnostic Note |
|-----------------|---|--|-----------------|
| KEY SW | Unlock warning switch signal / ON or OFF | ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder | - |
| IG SW | Ignition switch signal / ON or OFF | ON: Ignition switch ON (IG or ACC) OFF: Ignition switch OFF | - |
| IMMOBILISER | Immobiliser system status / SET or UNSET | SET: No key is in ignition key cylinder UNSET: Key is in ignition key cylinder | - |
| PERMIT (START) | Engine starting control / OK or NG | OK: Engine start is permitted NG: Engine start is not permitted | - |
| RESPONSE | Transponder chip data / NG or OK | NG: Data error OK: Data OK | - |
| FRAME ERROR | Transponder chip data / NG or OK | NG: Data error OK: Data OK | - |
| SERIAL NUMBER | Transponder chip data / NG or OK | NG: Data error OK: Data OK | - |
| ENCRYPT CODE | Transponder chip data / NG or OK | NG: Data error OK: Data OK | - |
| STATUS | Transponder chip data / NG or OK | NG: Data error OK: Data OK | - |
| BCC | Transponder chip signal / NG or OK | NG: Incorrect data sent OK: Correct data sent | - |
| SUB KEY | Sub-key code signal / MATCH or NOMATCH | MATCH: Registered sub-key code is sent NOMATCH: Unmatched sub-key code is sent | - |
| MASTER KEY | Master key code signal / MATCH or NOMATCH | MATCH: Registered master key code is sent NOMATCH: Unmatched master key code is sent | - |
| REGIST SUB CODE | Number of registered sub-keys / min.: 0, max.: 15 | Number of registered sub-keys | - |
| REGIST MAS CODE | Number of registered master keys / min.: 0, max.: 15 | Number of registered master keys | - |
| REG CODE SPACE | Key registration code memory space full / NOTFULL or FULL | NOTFULL: Possible to register more key codes FULL: Cannot register any more key codes | - |

| Item | Measurement Item / Display (Range) | Normal Condition | Diagnostic Note |
|--------------|---|--|-----------------|
| +B | +B judgment / NORMAL or BREAK | NORMAL: Battery supply is normal BREAK: Battery supply is malfunctioning | - |
| ANTENNA COIL | Transponder key coil condition / NORMAL or FAIL | NORMAL: Transponder key coil is normal FAIL: Transponder key coil is malfunctioning | - |

2. PERFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the tester ON.
- Select the following menu items: DIAGNOSIS / OBD/MOBD / IMMOBILISER / ACTIVE TEST.
- Perform the ACTIVE TEST by referring to the table below.

Transponder key ECU:

| Item | Test Details | Diagnostic Note |
|----------------|--|-----------------|
| SECURITY INDIC | Turns security indicator light / ON or OFF | - |

DIAGNOSTIC TROUBLE CODE CHART

Transponder key ECU:

| DTC No. | Detection Item | Trouble Area | See page |
|---------|--|---|-----------------------|
| B2780 | Push Switch / Key Unlock Warning Switch Malfunction | - Transponder key ECU - Unlock warning switch - Wire harness | EI-21 |
| B2784 | Antenna Coil Open / Short | - Transponder key ECU - Transponder key amplifier - Wire harness | EI-24 |
| B2793 | Transponder Chip Malfunction | Key | EI-26 |
| B2794 | Unmatched Encryption Code | Key | EI-27 |
| B2795 | Unmatched Key Code | Key | EI-28 |
| B2796 | No Communication in Immobiliser System | - Transponder key ECU - Key - Wire harness - Transponder key amplifier | EI-29 |
| B2797 | Communication Malfunction No. 1 | - Key - Wire harness - Transponder key ECU - Transponder key amplifier | EI-32 |
| B2798 | Communication Malfunction No. 2 | Key | EI-29 |

ECM:

| DTC No. | Detection Item | Trouble Area | See page |
|---------|---------------------------|--|-----------------------|
| B2799 | Engine Immobiliser System | - Wire harness - Transponder key ECU - ECM | EI-36 |

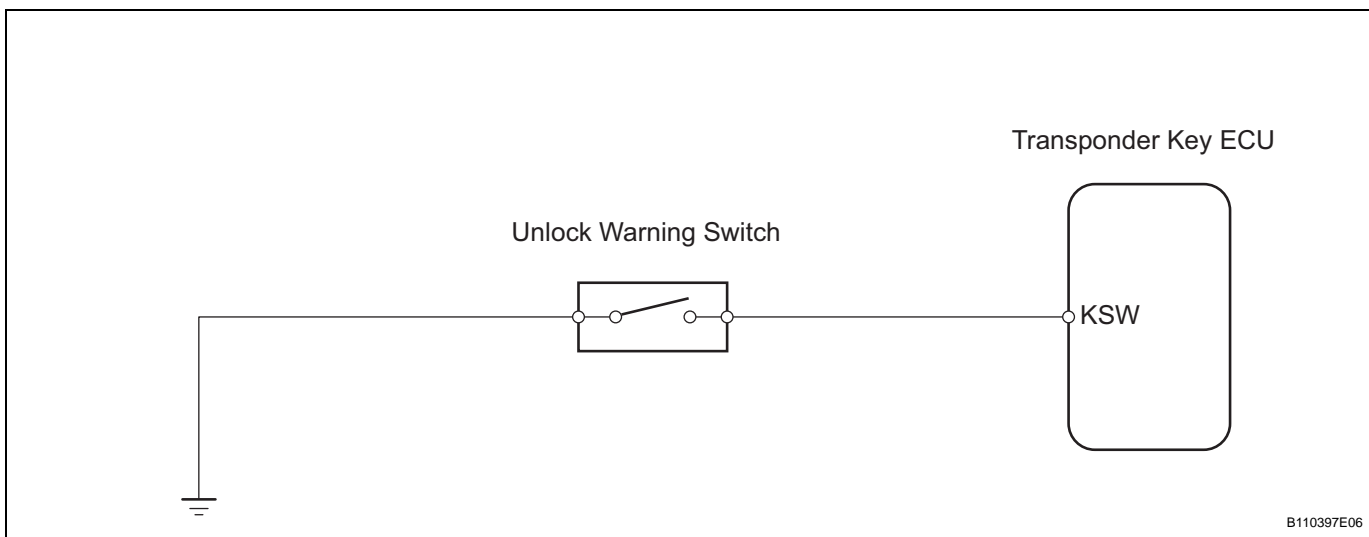
| | | |
|------------|--------------|--|
| DTC | B2780 | Push Switch / Key Unlock Warning Switch Malfunction |
|------------|--------------|--|

DESCRIPTION

This DTC is output if the transponder key ECU does not detect that the unlock warning switch is ON even when the ignition switch is ON. Under normal conditions, the unlock warning switch is ON when the ignition switch is ON.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|---|--|
| B2780 | Unlock warning switch ON is not detected when ignition switch is ON | <ul style="list-style-type: none"> Transponder key ECU Unlock warning switch Wire harness |

WIRING DIAGRAM



INSPECTION PROCEDURE

E

1 READ VALUE OF INTELLIGENT TESTER (UNLOCK WARNING SWITCH)

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON with a key that cannot start the engine.
- On the intelligent tester, enter the following menus: DIAGNOSIS / OBD/MOBD / IMMOBILISER / DATA LIST / KEY SW. Read the result.

Transponder key ECU:

| Item | Measurement Item / Display (Range) | Normal Condition | Diagnostic Note |
|--------|--|--|-----------------|
| KEY SW | Unlock warning switch signal / ON or OFF | ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder | - |

OK:

ON (key is in ignition key cylinder) appears on the screen.

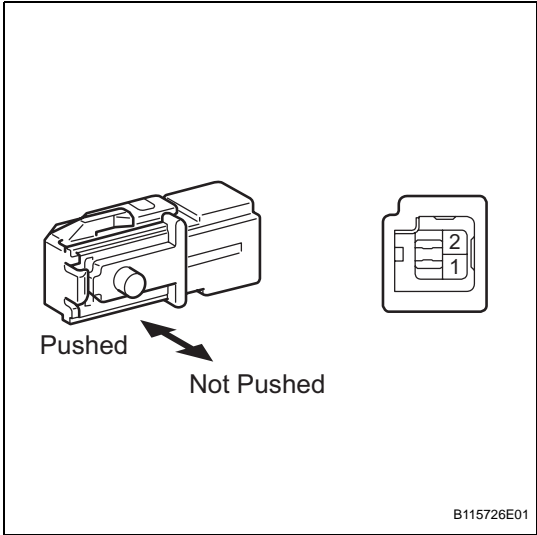
OK

REPLACE TRANSPONDER KEY ECU

NG

2

INSPECT UNLOCK WARNING SWITCH ASSEMBLY



- (a) Remove the unlock warning switch.
- (b) Measure the resistance of the switch.

Standard resistance

| Tester Connection | Condition | Specified Condition |
|-------------------|------------|-------------------------|
| 1 - 2 | Pushed | Below 1 Ω |
| | Not pushed | 10 k Ω or higher |

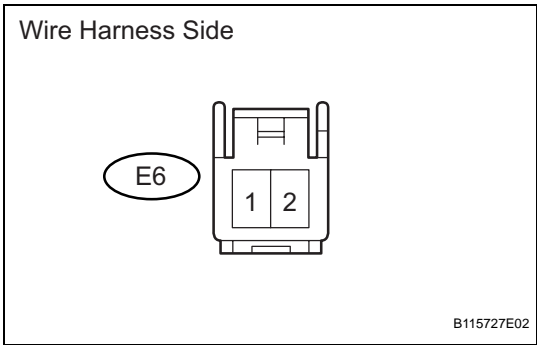
NG

REPLACE UNLOCK WARNING SWITCH ASSEMBLY

OK

3

CHECK WIRE HARNESS (UNLOCK WARNING SWITCH - BODY GROUND)



- (a) Disconnect the E6 switch connector.
- (b) Measure the resistance of the wire harness side connector.

Standard resistance

| Tester Connection | Specified Condition |
|--------------------|---------------------|
| E6-2 - Body ground | Below 1 Ω |

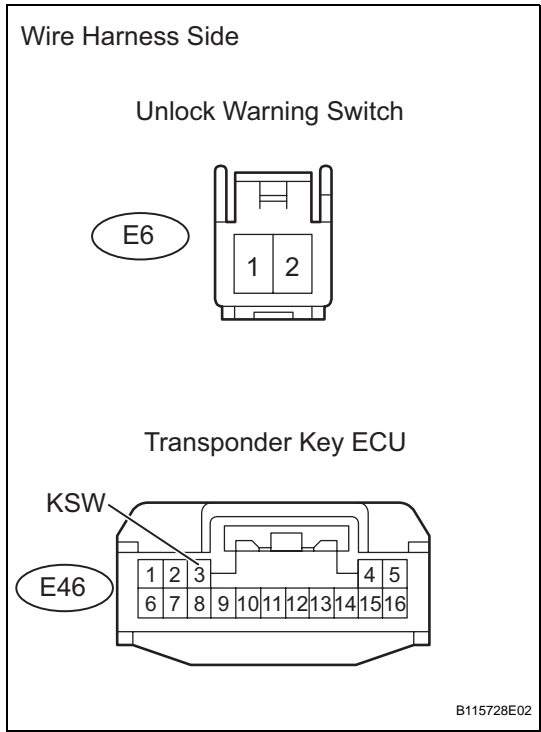
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4

CHECK WIRE HARNESS (UNLOCK WARNING SWITCH - TRANSPONDER KEY ECU)



- (a) Disconnect the E6 switch connector.
- (b) Disconnect the E46 ECU connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

| Tester Connection | Specified Condition |
|-----------------------------------|---------------------|
| E6-1 - E46-3 (KSW) | Below 1 Ω |
| E6-1 or E46-3 (KSW) - Body ground | 10 kΩ or higher |

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE TRANSPONDER KEY ECU

DTC

B2784

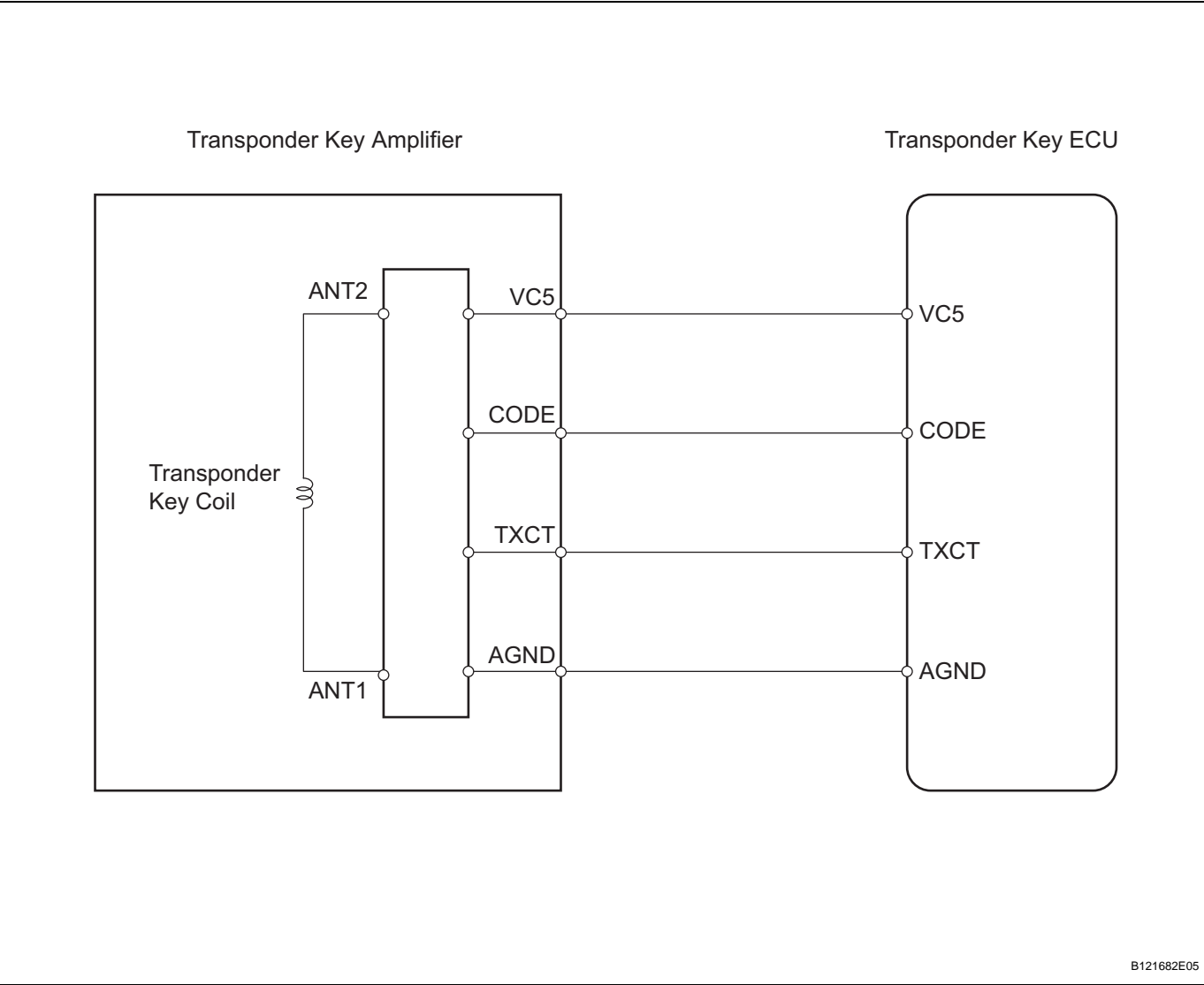
Antenna Coil Open / Short

DESCRIPTION

The transponder key coil receives key code signals from the transponder chip in the key grip. The coil built into the transponder key amplifier amplifies the key code signals and outputs the signal to the transponder key ECU.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|--|--|
| B2784 | When transponder key coil is open or short | <ul style="list-style-type: none"> Transponder key ECU Transponder key amplifier Wire harness |

WIRING DIAGRAM



EI

INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER (TRANSPONDER KEY COIL)

- Connect the intelligent tester (with CAN VIM) to the DLC3.

- (b) Turn the ignition switch ON with a key that cannot start the engine.
- (c) On the intelligent tester, enter the following menus:
DIAGNOSIS / OBD/MOBD / IMMOBILISER / DATA LIST / ANTENNA COIL. Read the result.

Transponder key ECU:

| Item | Measurement Item / Display (Range) | Normal Condition | Diagnostic Note |
|--------------|---|--|-----------------|
| ANTENNA COIL | Transponder key coil condition / NORMAL or FAIL | NORMAL: Transponder key coil is normal FAIL: Transponder key coil is malfunctioning | - |

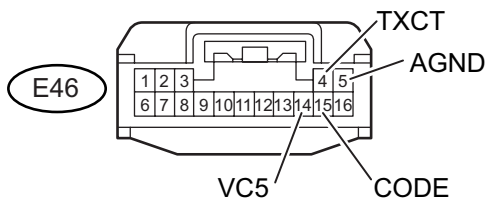
OK:

NORMAL (Transponder key coil is normal) appears on the screen.

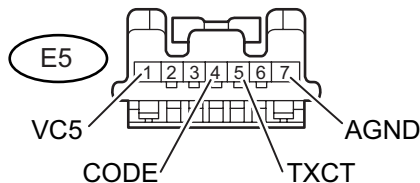
OK**REPLACE TRANSPONDER KEY ECU****NG****2****CHECK WIRE HARNESS (TRANSPONDER KEY ECU - TRANSPONDER KEY AMPLIFIER)**

Wire Harness Side

Transponder Key ECU



Transponder Key Amplifier



B110403E14

- (a) Disconnect the E46 ECU connector.
- (b) Disconnect the E5 amplifier connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

| Tester Connection | Specified Condition |
|--|-------------------------|
| E46-14 (VC5) - E5-1 (VC5) | Below 1 Ω |
| E46-15 (CODE) - E5-4 (CODE) | |
| E46-4 (TXCT) - E5-5 (TXCT) | |
| E46-5 (AGND) - E5-7 (AGND) | |
| E46-14 (VC5) or E5-1 (VC5) - Body ground | 10 k Ω or higher |
| E46-15 (CODE) or E5-4 (CODE) - Body ground | |
| E46-4 (TXCT) or E5-5 (TXCT) - Body ground | |
| E46-5 (AGND) or E5-7 (AGND) - Body ground | |

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****REPLACE TRANSPONDER KEY AMPLIFIER**

DTC**B2793****Transponder Chip Malfunction****DESCRIPTION**

This DTC is output when: 1) during key code registration, a key malfunction occurs; 2) the key code was unable to be registered properly.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|------------------------------|--------------|
| B2793 | Transponder chip malfunction | Key |

INSPECTION PROCEDURE**1****REREGISTER KEY**

- (a) Clear the DTC (see page [EI-18](#)).
- (b) Reregister the key code with the transponder key ECU (see page [EI-5](#))
- (c) Check that the engine starts with the key.

OK:**Engine starts.****NG****REPLACE KEY****OK****END**

| | | |
|-----|-------|---------------------------|
| DTC | B2794 | Unmatched Encryption Code |
|-----|-------|---------------------------|

DESCRIPTION

This DTC is output when a key with an incomplete key code is inserted into the ignition key cylinder.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|--|--------------|
| B2794 | Key with incomplete key code is inserted | Key |

INSPECTION PROCEDURE

| | |
|---|----------------|
| 1 | REREGISTER KEY |
|---|----------------|

- (a) Clear the DTC (see page EI-18).
- (b) Reregister the key code with the transponder key ECU (see page EI-5)
- (c) Check that the engine starts with the key.

OK:
Engine starts.

OK

| | |
|----|-------------|
| NG | REPLACE KEY |
|----|-------------|

| |
|-----|
| END |
|-----|

DTC**B2795****Unmatched Key Code****DESCRIPTION**

This DTC is output when a key code that has not been registered in the transponder key ECU is inserted into the ignition key cylinder.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|--|--------------|
| B2795 | Key with unregistered key code is inserted | Key |

INSPECTION PROCEDURE**1****REREGISTER KEY**

- (a) Clear the DTC (see page [EI-18](#)).
- (b) Reregister the key code with the transponder key ECU (see page [EI-5](#))
- (c) Check that the engine starts with the key.

OK:**Engine starts.****NG****REPLACE KEY****OK****END**

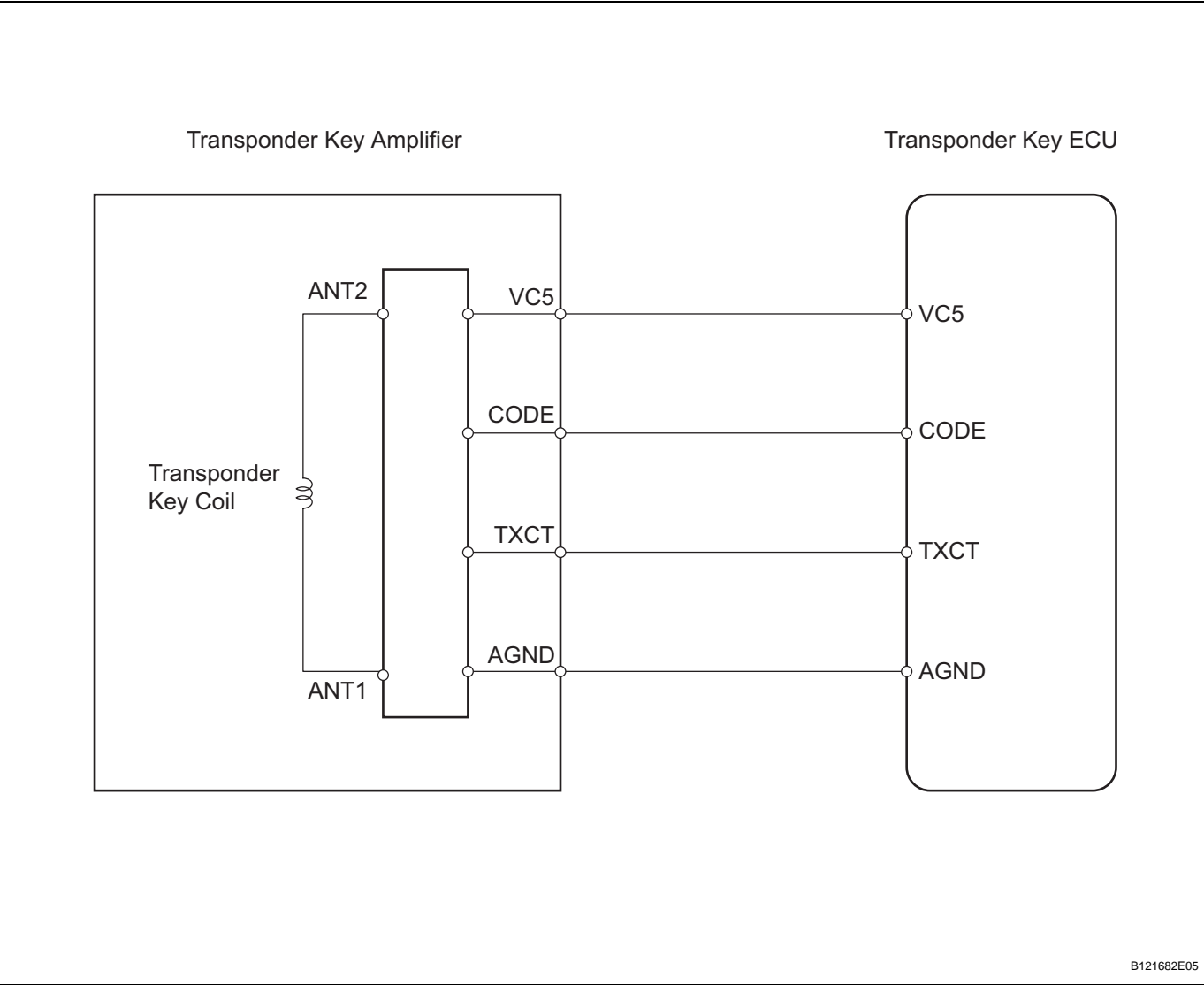
| | | |
|-----|-------|--|
| DTC | B2796 | No Communication in Immobiliser System |
| DTC | B2798 | Communication Malfunction No. 2 |

DESCRIPTION

When a key is inserted into the ignition key cylinder but no communication occurs between the key and transponder key ECU, DTC B2796 is output. When a key is inserted into the ignition key cylinder but a communication error occurs between the key and transponder key ECU, DTC B2798 is output.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|-------------------------|--|
| B2796 | No communication | <ul style="list-style-type: none">• Transponder key ECU• Key• Wire harness• Transponder key amplifier |
| B2798 | Communication error | Key |

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF INTELLIGENT TESTER (ENGINE IMMOBILISER SYSTEM)

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON with a key that cannot start the engine.
- (c) On the intelligent tester, enter the following menus: DIAGNOSIS / OBD/MOBD / IMMOBILISER / DATA LIST / IMMOBILISER. Read the result.

Transponder key ECU:

| Item | Measurement Item / Display (Range) | Normal Condition | Diagnostic Note |
|-------------|--|---|-----------------|
| IMMOBILISER | Immobiliser system status / SET or UNSET | SET: No key is in ignition key cylinder UNSET: Key is in ignition key cylinder | - |

OK:**UNSET (key is in ignition key cylinder) appears on the screen.****OK****REPLACE TRANSPONDER KEY ECU****NG****2 CHECK WHETHER ENGINE STARTS WITH OTHER KEY**

- (a) Check whether the engine starts with the vehicle's other keys.

OK:**Engine starts.****NG****REREGISTER OR REPLACE KEY THAT CANNOT START ENGINE****OK****3 READ VALUE OF INTELLIGENT TESTER (TRANSPONDER KEY COIL)**

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON with a key that cannot start the engine.
- (c) On the intelligent tester, enter the following menus: DIAGNOSIS / OBD/MOBD / IMMOBILISER / DATA LIST / ANTENNA COIL. Read the result.

Transponder key ECU:

| Item | Measurement Item / Display (Range) | Normal Condition | Diagnostic Note |
|--------------|--|--|-----------------|
| ANTENNA COIL | Transponder key coil condition/ NORMAL or FAIL | NORMAL: Transponder key coil is normal FAIL: Transponder key coil is malfunctioning | - |

OK:
NORMAL (Transponder key coil is normal) appears on the screen.

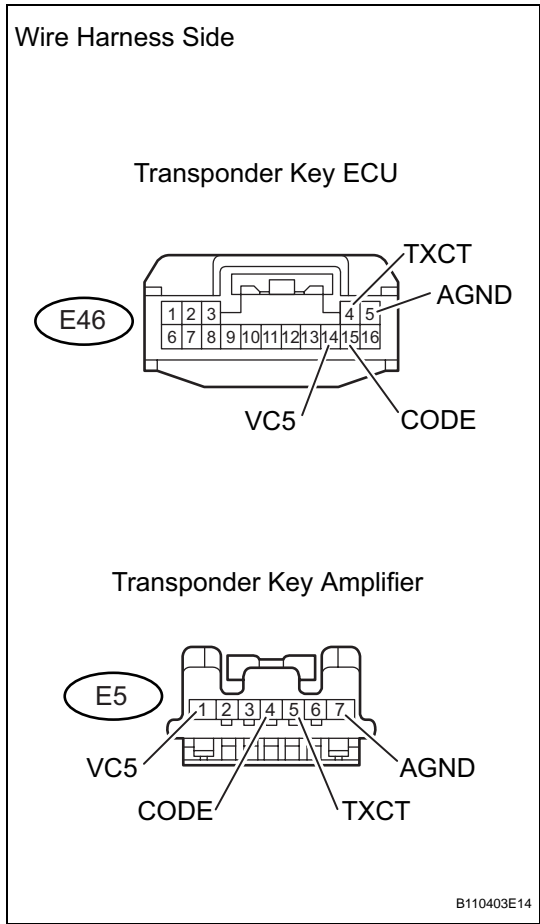
OK

REPLACE TRANSPONDER KEY ECU

NG

4

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - TRANSPONDER KEY AMPLIFIER)



- (a) Disconnect the E46 ECU connector.
(b) Disconnect the E5 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

| Tester Connection | Specified Condition |
|--|---------------------|
| E46-14 (VC5) - E5-1 (VC5) | Below 1 Ω |
| E46-15 (CODE) - E5-4 (CODE) | |
| E46-4 (TXCT) - E5-5 (TXCT) | |
| E46-5 (AGND) - E5-7 (AGND) | |
| E46-14 (VC5) or E5-1 (VC5) - Body ground | 10 kΩ or higher |
| E46-15 (CODE) or E5-4 (CODE) - Body ground | |
| E46-4 (TXCT) or E5-5 (TXCT) - Body ground | |
| E46-5 (AGND) or E5-7 (AGND) - Body ground | |

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5

CHECK TRANSPONDER KEY AMPLIFIER (OPERATION)

- (a) Temporarily replace the transponder key amplifier with a new or normally functioning one..
(b) Check that the engine starts normally.

OK:
Engine starts normally.

NG

REPLACE TRANSPONDER KEY ECU

OK

END (TRANSPONDER KEY AMPLIFIER IS DEFECTIVE)

DTC

B2797

Communication Malfunction No. 1

DESCRIPTION

This DTC is output when a communication error occurs between the transponder key amplifier and transponder key ECU. Some possible reasons for the communication error are: 1) 2 or more ignition keys are positioned too close together, or 2) noise is occurring in the communication line.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|---|--|
| B2797 | Keys are positioned too close to each other, or noise occurred in communication line | <ul style="list-style-type: none">• Key• Wire harness• Transponder key amplifier• Transponder key ECU |

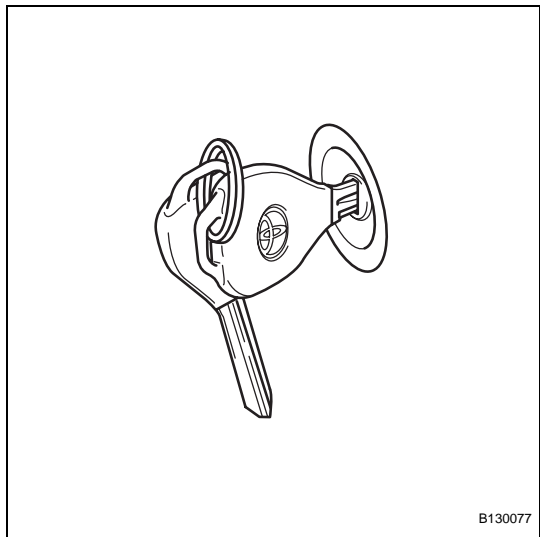
WIRING DIAGRAM



INSPECTION PROCEDURE

1

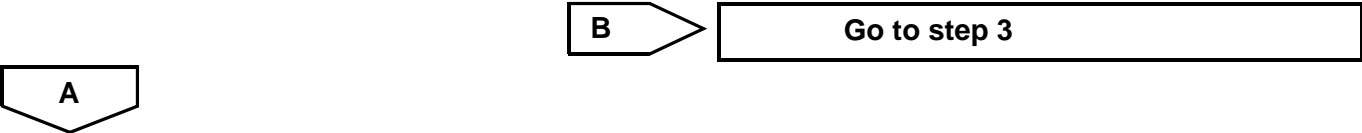
CHECK KEY



- (a) Check if the ignition key being used is near other ignition keys. Also, check if the key ring is in contact with the key grip.

Result:

| Result | Proceed to |
|--|------------|
| Key is near other keys and/or key ring is in contact with key grip | A |
| Key is not near other keys and/or key ring is not in contact with key grip | B |

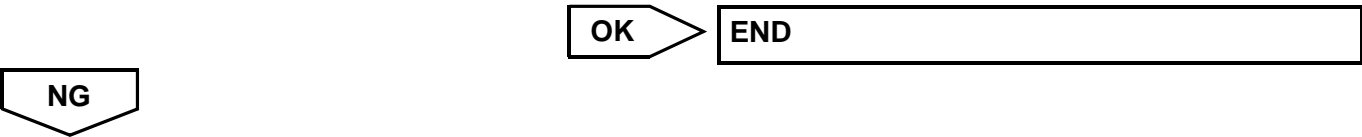


2

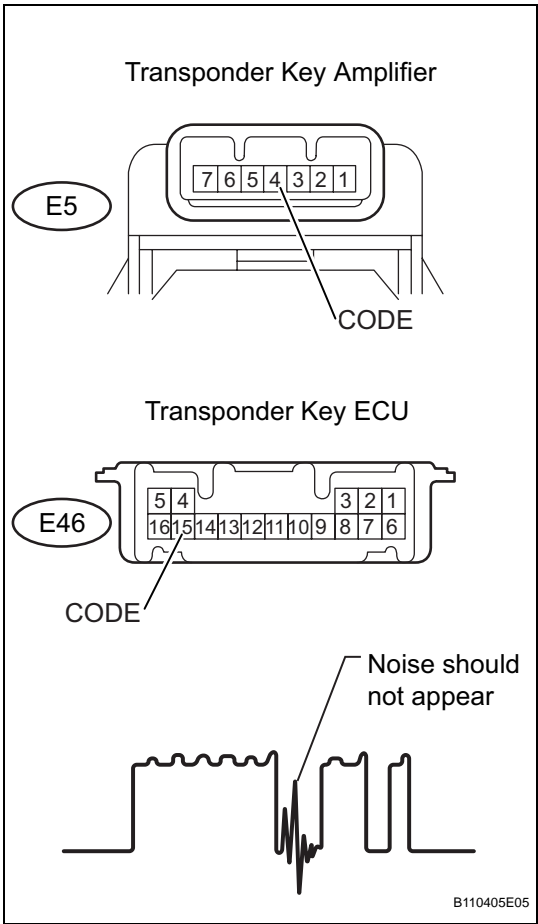
CHECK FOR DTC

- (a) Separate the keys from each other and / or remove the key ring.
(b) Clear the DTC (see page [EI-18](#)).
(c) Insert a key into the ignition key cylinder. Remove it. Repeat for all other keys.
(d) Check that no DTC is output.

OK:
No DTC is output.



3 CHECK TRANSPONDER KEY ECU (NOISE)



- (a) Using an oscilloscope or the intelligent tester, check for noise in the waveform between the terminals of the E5 amplifier connector and E46 ECU connector.

OK:

No noise is present (see illustration).

| Tester Connection | Tool Setting | Tool Setting | Specified Condition |
|-----------------------------|-------------------------|--------------|---------------------|
| E46-15 (CODE) - E5-4 (CODE) | 5 V/DIV., 20 msec./DIV. | Key inserted | No noise is present |

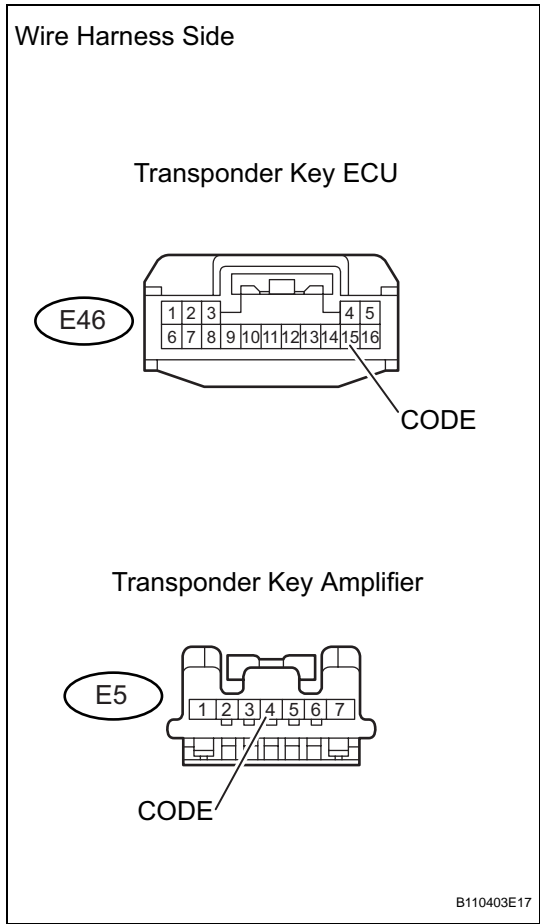
NG

FIND CAUSE OF NOISE AND REMOVE IT

OK

4

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - TRANSPONDER KEY AMPLIFIER)



- (a) Disconnect the E46 ECU connector.
- (b) Disconnect the E5 amplifier connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

| Tester Connection | Specified Condition |
|--|---------------------|
| E46-15 (CODE) - E5-4 (CODE) | Below 1 Ω |
| E46-15 (CODE) or E5-4 (CODE) - Body ground | 10 kΩ or higher |

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5

CHECK TRANSPONDER KEY AMPLIFIER (OPERATION)

- (a) Temporarily replacing the transponder key amplifier with a new or normally functioning one.
- (b) Check that the engine starts normally.

OK:
Engine starts.

NG

REPLACE TRANSPONDER KEY ECU

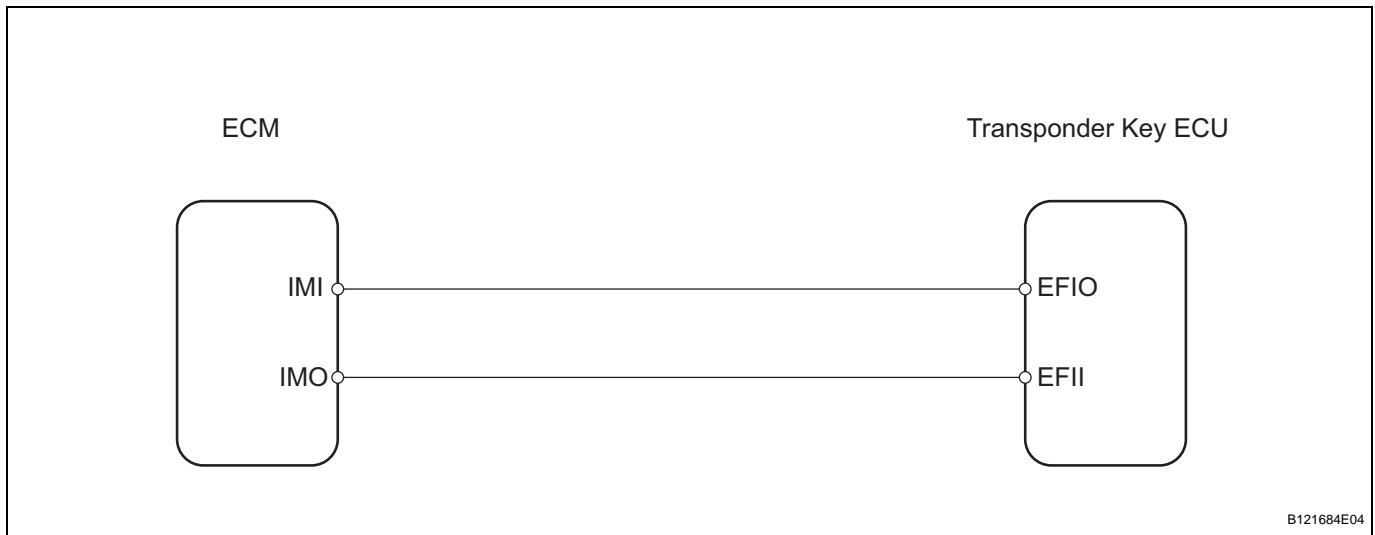
OK

END (TRANSPONDER KEY AMPLIFIER IS DEFECTIVE)

DTC**B2799****Engine Immobiliser System Malfunction****DESCRIPTION**

This DTC is output when one of the following occurs: 1) the ECM detects errors in its own communications with the transponder key ECU; 2) the ECM detects errors in the communication lines; or 3) the ECU communication ID between the transponder key ECU and ECM is different and an engine start is attempted. Before troubleshooting for this DTC, make sure no transponder key ECU DTCs are present. If present, troubleshoot the transponder key ECU DTCs first.

| DTC No. | DTC Detection Condition | Trouble Area |
|---------|---|--|
| B2799 | One of following conditions is met: <ul style="list-style-type: none"> Error in communication between ECM and transponder key ECU Error in communication lines Communication ID is different during communication with transponder key ECU | <ul style="list-style-type: none"> Wire harness Transponder key ECU ECM |

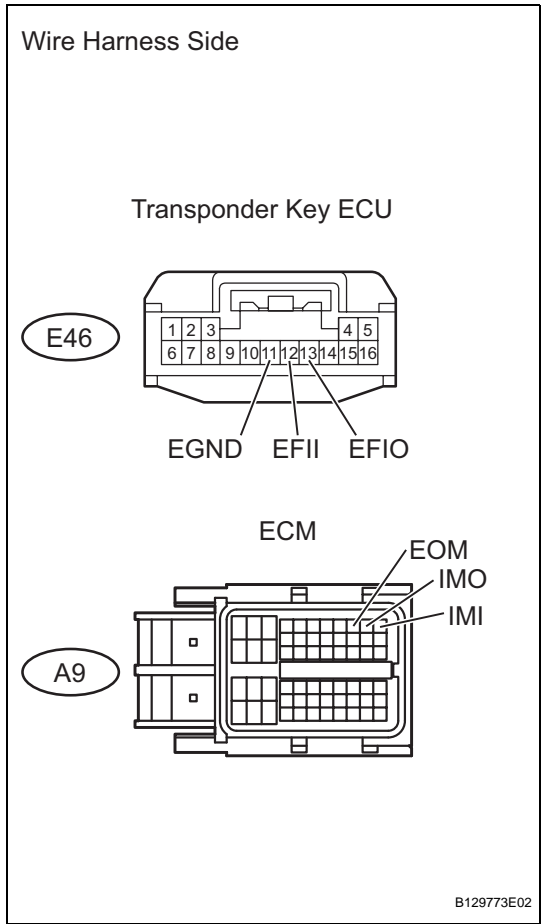
WIRING DIAGRAM**INSPECTION PROCEDURE****1****CHECK FOR DTC**

- Delete the DTC (see page [EI-18](#)).
- Recheck for DTC.

OK:**B2799 output does not reoccur.****OK****NORMAL****NG**

2

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - ECM)



- (a) Disconnect the E46 ECU connector.
- (b) Disconnect the A9 ECM connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

| Tester Connection | Specified Condition |
|--|---------------------|
| E46-13 (EFIO) - A9-11 (IMI) | Below 1 Ω |
| E46-12 (EFII) - A9-10 (IMO) | |
| E46-11 (EGND) - A9-9 (EOM) | |
| E46-13 (EFIO) or A9-11 (IMI) - Body ground | 10 kΩ or higher |
| E46-12 (EFII) or A9-10 (IMO) - Body ground | |

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3

CHECK TRANSPONDER KEY ECU (OPERATION)

- (a) Temporarily replace the transponder key ECU with a new or normally functioning one.
- (b) Check that then engine starts normally.

OK:
Engine starts normally.

NG

REPLACE ECM

OK

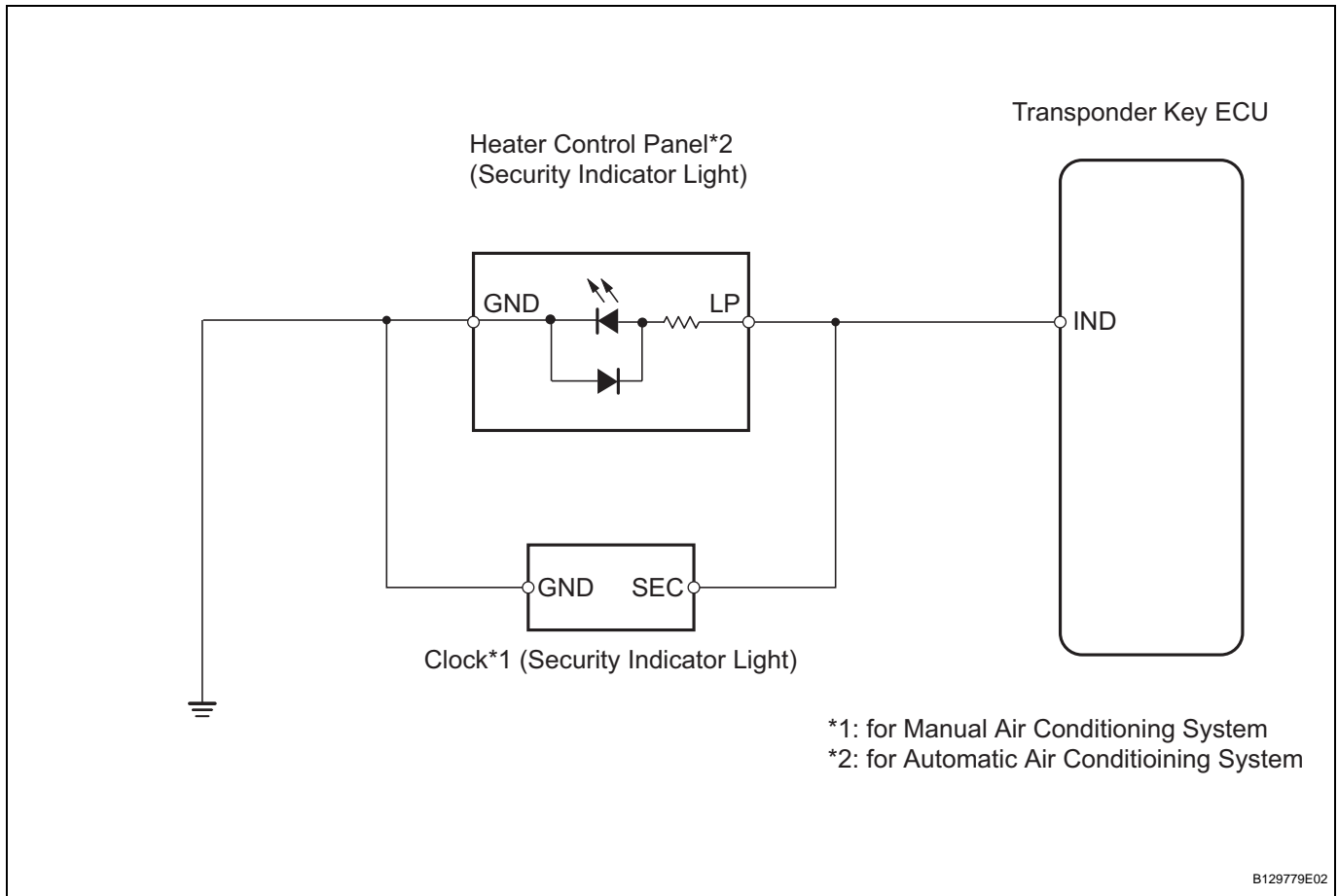
END (TRANSPONDER KEY ECU IS DEFECTIVE)

Security Indicator Light Circuit

DESCRIPTION

When the transponder key is registered, the transponder key ECU indicates the key registration condition by lighting up, blinking or turning off the security indicator.

WIRING DIAGRAM



INSPECTION PROCEDURE

1

PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SECURITY INDICATOR LIGHT)

- (a) Select the ACTIVE TEST, use the intelligent tester (with CAN VIM) to generate a command, and then check that the security indicator light operation is normal.

Transponder key ECU:

| Item | Normal Condition | Diagnostic Note |
|----------------|---|-----------------|
| SECURITY INDIC | Security indicator light turns ON / OFF | - |

OK:

Security indicator light turns ON / OFF.

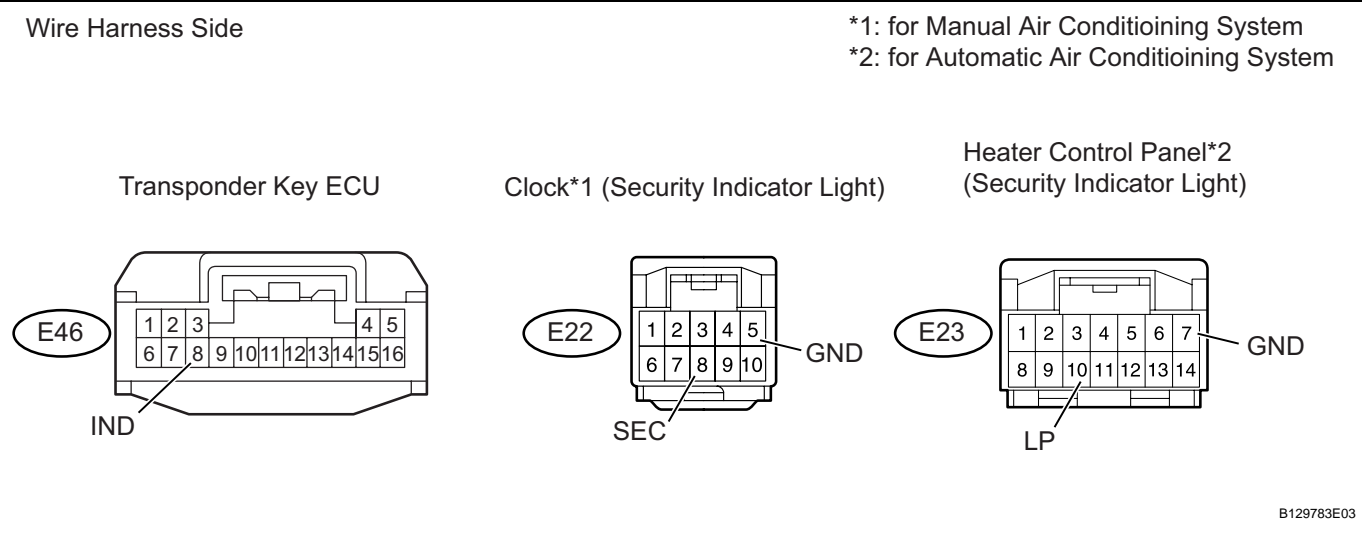
OK

Go to step 3

NG

2

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - SECURITY INDICATOR LIGHT)



- (a) Disconnect the E46 ECU connector.
- (b) Disconnect the E22*1 or E23*2 light connector.
- (c) Measure the resistance of the wire harness side connectors.

HINT:
*1: for Manual air conditioning system
*2: for Automatic air conditioning system

Standard resistance:
for Manual Air Conditioning System

| Tester Connection | Specified Condition |
|--|---------------------|
| E46-8 (IND) - E22-8 (SEC) | Below 1 Ω |
| E22-5 (GND) - Body ground | |
| E46-8 (IND) or E22-8 (SEC) - Body ground | 10 kΩ or higher |

for Automatic Air Conditioning System

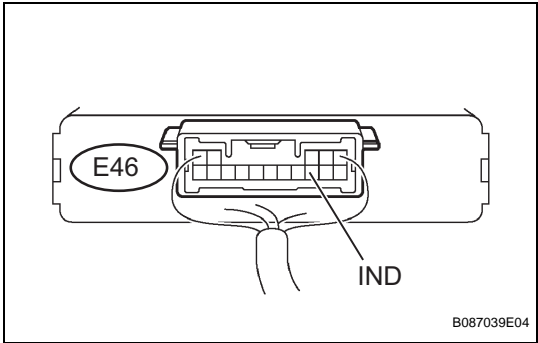
| Tester Connection | Specified Condition |
|--|---------------------|
| E46-8 (IND) - E23-10 (LP) | Below 1 Ω |
| E23-7 (GND) - Body ground | |
| E46-8 (IND) or E23-10 (LP) - Body ground | 10 kΩ or higher |

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 INSPECT TRANSPONDER KEY ECU (OUTPUT)



- (a) Remove the transponder key ECU with its connectors still connected.
 - (b) Measure the voltage of the ECU.
- Standard voltage**

| Tester Condition | Condition | Specified Condition |
|---------------------------|----------------------------------|---|
| E46-8 (IND) - Body ground | Engine immobiliser system is set | 10 to 14 V and below 1 V output alternately |

NG

REPLACE TRANSPONDER KEY ECU

OK

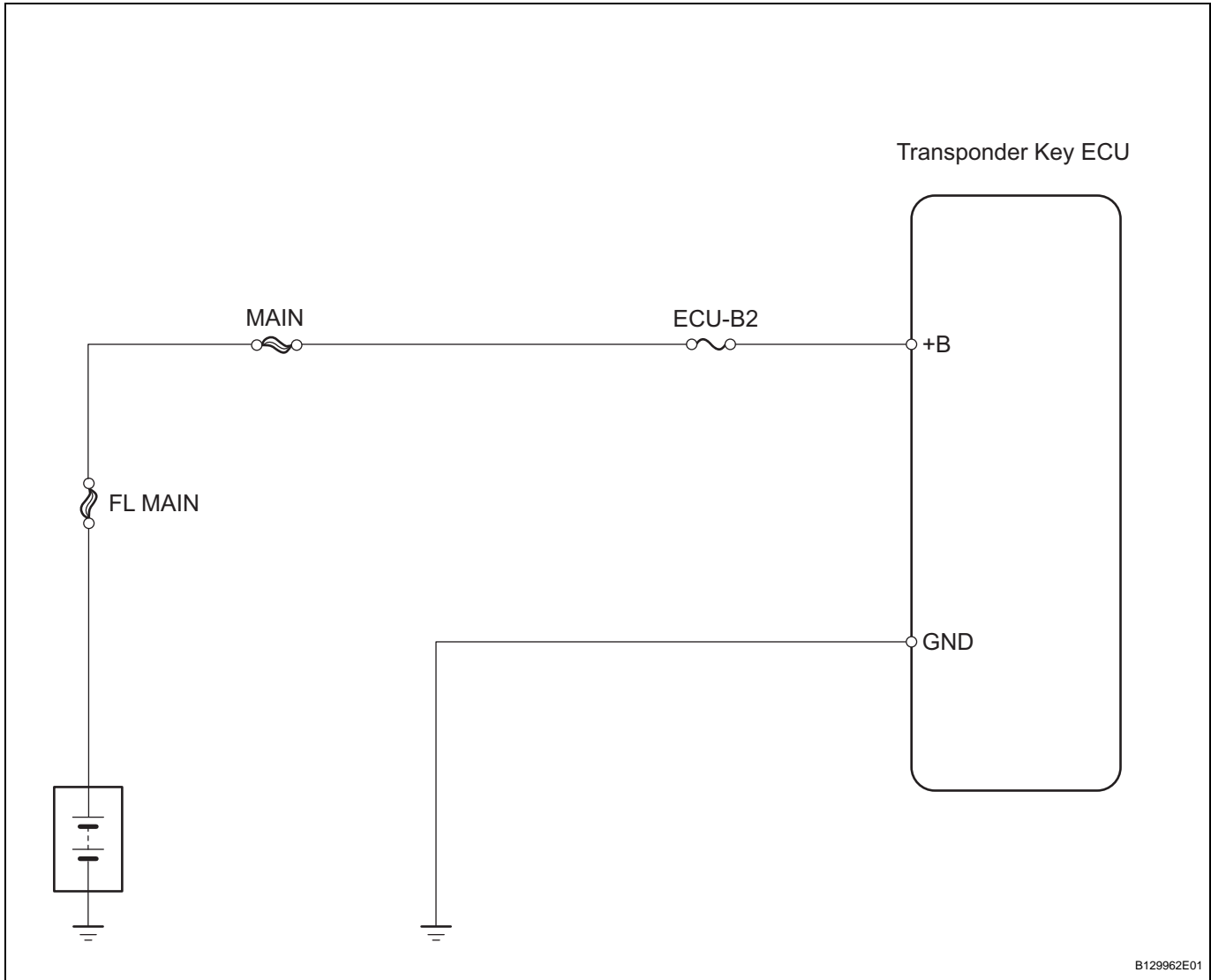
REPLACE CLOCK SUB-ASSEMBLY (for MANUAL AIR CONDITIONING SYSTEM), HEATER CONTROL PANEL (for AUTOMATIC AIR CONDITIONING SYSTEM)

ECU Power Source Circuit

DESCRIPTION

This circuit provides power to operate the transponder key ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE (ECU-B2)

- Remove the ECU-B2 fuse from the engine room No. 2 relay block.
- Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

NG

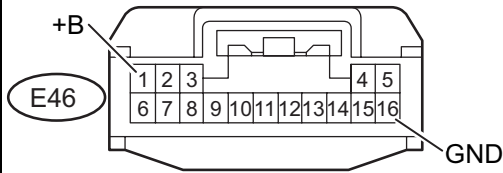
REPLACE FUSE

OK

2

CHECK WIRE HARNESS (TRANSPONDER KEY ECU - BATTERY AND BODY GROUND)

Wire Harness Side



B110782E09

- (a) Disconnect the E46 ECU connector.
- (b) Measure the resistance and voltage of the wire harness side connector.

Standard resistance

| Tester Connection | Specified Condition |
|----------------------------|---------------------|
| E46-16 (GND) - Body ground | Below 1 Ω |

Standard voltage

| Tester Connection | Specified Condition |
|--------------------------|---------------------|
| E46-1 (+B) - Body ground | 10 to 14 V |

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE